

REMARKS

The Office Action dated June 18, 2007, has been received and carefully noted. The above amendments and the following remarks are submitted as a full and complete response thereto.

By this Amendment, claim 8 is canceled and claim 1 is amended. No new matter has been added. Support for the amendments to claim 1 can be found on at least page 13, lines 10-11 of the specification as originally filed. Claims 1-7 are pending and respectfully submitted for consideration.

Rejections Under 35 U.S.C. § 112

Claim 1 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. The Applicants have amended claim 1 responsive to the rejection and respectfully submit that all claims are in compliance with U.S. patent practice.

Rejections Under 35 U.S.C. § 102

Claim 1 is rejected under 35 U.S.C. § 102(b) as being anticipated by Haller (U.S. Patent No. 2,695,230).

Claims 1, 5 and 6 are rejected under 35 U.S.C. § 102(b) as being anticipated by Umehara et al. (U.S. Patent No. 3,706,550, "Umehara").

Claims 1, 2, 3 and 6 are rejected under 35 U.S.C. § 102(e) as being anticipated by Park (WO 02/078881A1).

To the extent that the above-noted rejections remain applicable to the claims currently pending, the Applicants traverse the rejections and respectfully submit that claims 1-3, 5 and 6 recite subject matter that is neither disclosed nor suggested by the

cited references.

Claim 1, as amended, recites, a method for producing a metal formed article, comprising the steps of burying a formed article comprising a second metal whose melting point is lower than that of a first metal in a powder containing the first metal, and forming a powder formed article containing the formed article. The powder formed article is heated at a temperature lower than the melting point of the first metal and higher than the melting point of the second metal. The second metal is melted, allowing the molten second metal to move into voids in the powder containing the first metal. A space is formed in a region which has been occupied by the formed article comprising the second metal. The powder of the first metal and the molten second metal are sintered and solidified. The formed article comprising the second metal is a linear material having a sectional shape with diameters in a range of 50 to 500 μm . The powder formed article is heated to at least a melting point of the second metal at a temperature rising rate of 1 kelvin/second or more.

The Applicants respectfully submit that neither Haller nor Umehara disclose or suggest at least the combination of features of burying a formed article comprising a second metal in a powder containing a first metal and forming a space in a region which has been occupied by the formed article comprising the second metal, the formed article having a sectional shape with diameters in a range of 50 to 500 μm , as recited in claim 1. In addition, Park does not disclose or suggest this feature of the invention. In contrast, Park discloses a relief groove having an outer diameter of 27 mm, and inner diameter of 23 mm and 10 mm in depth being formed on the flange which is 90 mm in

diameter and 50 mm in height with a ring-shaped ablative members. See page 8, line 16 to page 9, line 4 of Park.

As a result of the claimed invention recited in claim 1, the formed article comprising the second metal is a linear material, and the diameter of the sectional shape of is in the range of 50 to 500 μm . Specifically, with this feature of the present invention, a micro flow channel is formed inside of the metal formed article. In addition, in the present invention, when the powder formed article is heated at a temperature rising rate of 1 kelvin/second or more, a continuous space having a fine tubular shape is securely formed in the region which has been occupied by the formed article comprising the second metal inside the metal formed article. None of Haller, Umehara or Park disclose or suggest this feature of the invention and therefore, fail to provide the critical and non-obvious effects discussed above.

Also, with respect to claim 1, which incorporates the subject matter of canceled claim 8, the Office Action acknowledges that while Haller and Park do not teach "wherein the powder formed article is heated to at least a melting point of the second metal at a temperature rising rate of 1 kelvin/second or more," it would have been obvious to one of ordinary skill in the art to have employed the method of Haller or Park, and to optimize the heating rate because ASM Handbook [Rajiv Tandon and John Johnson, "Liquid Phase Sintering," ASM Handbook, vol. 7, pp 565-573] teaches that Transient Liquid-Phase Sintering is "highly sensitive" to the heating rate. See page 7, line 13 to page 8 line 7 of the Office Action. In contrast, the "heating rate" disclosed in the ASM Handbook is used to melt mixed powders to form a transient liquid in a

transient liquid-phase sintering process. Thus, the heating rate in the ASM Handbook differs from the claimed “a temperature rising rate” which is adjusted when the formed article comprising the second metal whose melting point is lower than that of the first metal is buried beforehand in the powder containing the first metal, and the molten second metal moves between particles of the powder formed article containing the first metal. Therefore, it would not have been obvious to one of ordinary skill in the art to modify Haller or Park and to adjust the temperature rising rate to meet that of the claimed invention, because the heating rate of the ASM Handbook is not comparable to the claimed the temperature rising rate recited in claim 1.

As such, the Applicants respectfully submit that Haller, Umehara and Park do not disclose or suggest each and every feature of the invention as recited in amended claim 1. Further, ASM Handbook would fail to cure the deficiencies in Haller and Park, with respect to amended claim 1.

To qualify as prior art under 35 U.S.C. § 102, each and every feature recited in a rejected claim must be disclosed by the applied art. Accordingly, Haller, Umehara and Park do not anticipate claim 1, nor is claim 1 obvious in view of Haller, Umehara, Park and ASM Handbook. Therefore, the Applicants submit that claim 1 is allowable over the cited references.

Rejections Under 35 U.S.C. § 103

Claim 4 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Haller in view of Sachs et al. (U.S. Patent Application Publication No. 2004/0009086, “Sachs”)

Claim 7 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Haller in view of Kawano et al. (U.S. Patent No. 4,971,755, "Kawano").

Claim 8 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Haller or Park in view of ASM Handbook. As noted above, claim 8 has been canceled.

To the extent that the above-noted rejections remain applicable to the claims currently pending, the Applicants traverse the rejections and respectfully submit that claims 4 and 7 recite subject matter that is neither disclosed nor suggested by the cited references.

Claims 4 and 7 depend from claim 1. As discussed above, Haller and Park do not disclose or suggest the features of the invention as recited in claim 1. Sachs, Kawano and ASM Handbook fail to cure the deficiencies in Haller and Park, as Sachs, Kawano and ASM Handbook do not disclose or suggest at least the combination of features of the formed article comprising the second metal is a linear material having a sectional shape with diameters in a range of 50 to 500 μm , and the powder formed article is heated to at least a melting point of the second metal at a temperature rising rate of 1 kelvin/second or more. As such, the cited references do not disclose or suggest the features of the invention as recited in dependent claims 4 and 7.

To establish a *prima facie* case of obviousness, each and every feature of a rejected claim must be taught or suggested by the applied art of record. See M.P.E.P. § 2143.03.

In view of the above, the Applicants respectfully submit that Haller and Park, Sachs, Kawano and ASM Handbook fail to support a *prima facie* case of obviousness

for purposes of a rejection of claims 4 and 7 under 35 U.S.C. § 103. Accordingly, claims 4 and 7 are not rendered obvious in view of Haller, Park, Sachs, Kawano and ASM Handbook and should be deemed allowable.

Conclusion

The Applicants respectfully submit that claim 1 is allowable. Claims 2-7 depend from claim 1. The Applicants further submit that each of these claims incorporate the patentable aspects thereof, and are therefore allowable for at least the same reasons as discussed above. Accordingly, the Applicants respectfully request withdrawal of the rejections, allowance of claims 1-7 and the prompt issuance of a Notice of Allowability.

Should the Examiner believe anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number listed below.

In the event this paper is not considered to be timely filed, the Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper,

may be charged to counsel's Deposit Account No. 01-2300, **referencing Attorney Dkt.**

No. 101175-00061.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Rhonda L. Barton", with a horizontal line underneath.

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